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Muscardine in the case of the silk worm, the theory seems plausible that we may in time learn on the other hand, how to suppress injurious insects by fostering the growth of parasitic fungi which would spread infection among them and carry with it disease and death.

Finally, it must be confessed that the main question at issue is by no means decided, perhaps not seriously affected by the experiments and conclusions which I have here recorded. Though the yeast fungus may not be destructive to the insects named, and under the given conditions, it may, nevertheless, be destructive to other insects, or even to these under other conditions, or if the yeast fungus should prove to be wholly worthless and unreliable, it does not follow that there are not other forms which may be successfully employed as insecticides to the very great advantage of our most important national industry.

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LIST OF THE BIRDS OF THE WILLAMETTE VALLEY, OREGON.

BY O. B. JOHNSON.

[*Concluded from the July number.*]

40. *Poœetes gramineus confinis* Bd. (Western grass finch).—Common during the summer, breeding extensively with the usual habits of the Eastern species.

41. *Chondestes grammacus* Say (lark finch).—Sparingly common during the summer, and breeding.

42. *Zonotrichia gambeli* Nutt. (Western white-crowned finch).—A very common summer resident, and nesting familiarly about gardens and thickets near dwellings.

43. *Zonotrichia coronata* Pall. (golden-crowned sparrow).—Sparingly common during summer and undoubtedly breeds, though I have not found its nest.

44. *Junco oregonus* Town. (Oregon snowbird).—Abundant during the winter and a few remaining to breed, the rest probably going to the mountains, where I hear of them. I have not yet seen its nest.

45. *Spizella socialis* Wil. (chipping sparrow).—A common summer resident, and breeding extensively with the usual habits of the species.

46. *Melospiza rufina* Bd. (rusty song sparrow).—A plentiful permanent resident, breeding commonly, and though I have found several nests with young, I have never seen its eggs.

47. *Passerella townsendi* Aud. (Townsend's fox sparrow).—Only a winter visitor; very shy and silent.

48. *Guiraca melanocephala* Swain. (black-headed grosbeak).—A common summer resident, breeding numerously.

49. *Cyanospiza amana* Say (blue linnet).—An abundant songster during summer, and breeding plentifully.

50. *Pipilo oregonus* Bell (Oregon ground robin).—A common, constant resident, breeding numerously.

51. *Eremophila alpestris* Boie (horned lark).—An abundant summer visitor, nesting very commonly.

52. *Agelaius phoeniceus* Linn. (swamp blackbird).—Very abundant in summer, breeding with the usual habits of the species.

53. *Agelaius gubernator* Wag. (red-shouldered blackbird).—Very abundant, with habits similar to the last.

54. *Sturnella neglecta* Aud. (Western field lark).—A constant resident, less common in winter; breeds.

55. *Icterus bullocki* Swain. (Western oriole).—Common in summer, breeding extensively.

56. *Scolecophagus cyanocephalus* Wag. (Brewer's blackbird).—Very abundant in summer, breeding numerously.

57. *Corvus carnivorus* Bart. (raven).—Not rare in the vicinity of Forest Grove; I have not seen its eggs.

58. *Corvus caurinus* Bd. (Western crow).—A common resident, breeding in communities.

59. *Picicorvus columbianus* Wil. (Clarke's crow).—Common in Cascade mountains, down to the foothills in winter. I have not seen its eggs.

60. *Pica hudsonica* Sab. (magpie).—Quite common in the vicinity of Forest Grove; it probably breeds, though I have not found its nest.

61. *Cyanura stelleri* Gmel. (Steller's jay).—An abundant resident, nesting in communities, at which time they are very silent.

62. *Cyanocitta californica* Vig. (California jay).—Common among deciduous trees, breeding about habitations.

63. *Perisoreus canadensis* Linn. (Canada jay).—Common in heavy timber in winter, probably breeds in mountains.

64. *Tyrannus verticalis* Say (Arkansas fly-catcher).—Common in summer, breeding in trees and about buildings.

65. *Sayornis nigricans* Swain. (black fly-catcher).—Saw a single example of this species in this place in July, 1879.

66. *Contopus borealis* Swain. (olive-sided fly-catcher).—Common in summer. I have not found its nest.

67. *Contopus richardsoni* Swain. (short-legged pewee).—Very common in summer, and breeds familiarly about orchards and houses; nest saddled upon a limb, composed of horsehair, strings and fine grass, and lined with cotton or wool; eggs usually three, sometimes four, cream-colored with dark-brown and lavender spots in a ring around the larger end. A set before me measure .66 by .54, .65 by .54, .65 by .53.

68. *Empidonax pusillus* Baird (little Western fly-catcher).—Quite common in summer, but I have not yet found its nest.

69. *Ceryle alcyon* Linn. (belted kingfisher).—Constant resident, breeds.

70. *Chordeiles popetue* Vieil. (night hawk).—Common in summer, breeding on gravelly islands in the Willamette river.

71. *Chaetura vauxi* Town. (Oregon swift).—I saw what I took to be this species in the Cascade mountains, in 1879.

72. *Selasphorus rufus* Gmel. (red-backed hummer).—A common summer resident, breeding; the only species observed.

73. *Coccyzus americanus* Linn. (yellow-billed cuckoo).—Rare; I have seen two specimens killed in this vicinity.

74. *Picus harrisi* Aud. (Harris' woodpecker).—Common resident, breeding extensively.

75. *Picus gairdneri* Aud. (Gairdner's woodpecker).—Abundant, nesting in tops of dead willows.

76. *Sphyrapicus ruber* Gmel. (red-breasted woodpecker).—Not very common; I found a nest in a cottonwood "stub," about thirty feet from the ground, containing young.

77. *Hylotomus pileatus* Linn. (pileated woodpecker).—Common in heavily timbered districts. I have not seen its nest, but presume that it breeds in the "Great Burn" to the eastward.

78. *Melanerpes torquatus* Wil. (Lewis' woodpecker).—Common along the Columbia in winter, a few remaining to breed.

79. *Colaptes mexicanus* Swain. (red-shafted woodpecker).—Abundant, nesting commonly. I have seen twenty nests at once in the College buildings at Forest Grove, where they have cut holes through the frieze.

80. *Bubo virginianus* var. *pacificus* Cass (Pacific horned owl).—Quite common. I have not found its nest.

81. *Scops asio* Linn. (screech owl).—Very common, breeding in hollow trees.

82. *Syrnium cinereum* Gmel. (great gray owl).—Occasionally seen in heavily wooded districts.

83. *Nyctale acadica* Gmel. (acadian owl).—I have a single example that flew into an open transom at a jewelry store in this place.

84. *Glaucidium californicum* Sclat. (pigmy owl).—Quite common; I have not seen the nest. They are savage little fellows, and will attack cage birds in daylight, and I know of two that suffered death thereby.

85. *Nyctea nivea* Danel. (snowy owl).—Occasionally killed in winter by hunters in this vicinity.

86. *Aquila canadensis* Linn. (American golden eagle).—Occasionally killed by hunters in this vicinity.

87. *Haliaëtus leucocephalus* Linn. (white-headed eagle).—Common along the Columbia, nesting in high trees. I have seen them pick up young lambs as fast as they were dropped.

88. *Pandion carolinensis* Gmel. (fish hawk).—Common along the Columbia and Willamette rivers, nesting on trees.

89. *Falco sparverius* Linn. (sparrow hawk).—Very common, nesting in holes, usually of a woodpecker.

90. *Accipiter cooperi* Bon. (Cooper's hawk).—Occasionally seen.

91. *Accipiter mexicanus* Swain. (Mexican hawk).—I have a specimen that I refer to this species.

92. *Accipiter fuscus* Gmel. (sharp-shinned hawk).—Moderately common, nesting in hollow trees.

93. *Buteo montanus* Nutt. (Western red-tail hawk).—Common; I have not seen its nest.

94. *Buteo elegans* Cass. (elegant hawk).—A single example referable to this species.

95. *Circus hudsonicus* Linn. (marsh hawk).—Moderately common, breeding.

96. *Cathartes aura* Linn. (turkey buzzard).—Common during summer, sailing the air; have not seen its nest.

97. *Columba fasciata* Say (band-tailed pigeon).—An abundant summer resident, feeding chiefly on berries. They nest in various situations much like the common dove (*Z. carolinensis*); I found

one of leaves and moss beside a tree, placed on the ground between two roots; another one upon an old stump that had been split and broken about eight feet from the ground; another was in the top of a fir (*A. grandis*), and was built of twigs laid upon the dense flat limb of the tree, about one hundred and eighty feet from the ground. These each had two eggs, pure white, and elliptical, differing from those of *Z. carolinensis* only in size; a set before me measure 1.60 by 1.20, 1.55 by 1.19. The first in my collection were obtained from the bodies of two females in 1877.

98. *Zenaidura carolinensis* Linn. (common dove).—An abundant summer resident, nesting commonly.

99. *Tetrao obscurus* Say (dusky grouse).—A common resident, breeding extensively.

100. *Bonasa sabinii* Baird (Oregon grouse).—Very common along water courses, where it breeds.

101. *Ortyx virginiana* Linn. (Virginian partridge).—Introduced and doing finely.

102. *Oreortyx pictus* Doug. (plumed partridge).—Very common throughout Western Oregon, breeding extensively.

103. *Grus canadensis* Temm. (sand-hill crane).—Common during the migrations.

104. *Ardea herodias* L. (great blue heron).—A common resident, breeding in communities in tall trees.

105. *Botaurus minor* Bon. (bittern).—A common resident, breeds.

106. *Nyctiardea gardeni* Baird (night heron).—A single example, obtained May, 1876, near Salem.

107. *Ægialites vociferus* L. (killdeer).—A common resident, breeds.

108. *Squatarola helvetica* L. (black-bellied plover).—Occasionally shot during the migrations.

109. *Phalaropus hyperboreus* L. (Northern phalarope).—Occasional during the migrations.

110. *Gallinago wilsoni* Temm. (Wilson's snipe).—Abundant during the migrations, a few remaining to breed.

111. *Macrorhamphus griseus* Gmel. (gray snipe).—Occasional during the migrations.

112. *Tringa americana* Cass. (red-backed sandpiper).—Occasional during the migrations.

113. *Tringoides macularius* L. (spotted sandpiper).—Summer resident, breeding in favorite localities.

114. *Rallus virginianus* L. (Virginia rail).—Occasionally shot by sportsmen.

115. *Fulica americana* Gmel. (mud hen).—Common in winter along the Columbia river.

116. *Cygnus americanus* Sharp. (American swan).—Not rare during the migrations.

117. *Cygnus buccinator* Rich. (trumpet swan).—Common during the migrations.

118. *Anser hyperboreus* Pal. (snow goose).—Common during migrations.

119. *Anser gambeli* Hart. (white-fronted goose).—Common during migrations.

120. *Bernicla canadensis* Bon. (Canada goose).—Abundant during migrations.

121. *Bernicla hutchinsi* Bon. (Hutchin's goose).—Common during the migrations.

122. *Anas boscas* L. (mallard).—This and the eight following are abundant, during the migrations, along the Columbia and Willamette rivers and their tributaries.

123. *Dafila acuta* Jen. (springtail).

124. *Nettion carolinensis* (green-winged teal).

125. *Spatula clypeata* (spoonbill).

126. *Chaulelasmus streperus* L. (gadwall).

127. *Mareca americana* Gmel. (American widgeon).

128. *Aix sponsa* L. (wood duck).

129. *Fulix collaris* Dan. (ring-necked duck).

130. *Aythya americana* Eyt. (red head).

131. *Aythya vallisneria* Wil. (canvas-back).—Usually abundant during the month of February.

132. *Bucephala americana* Bon. (golden-eye).

133. *Bucephala albeola* L. (butter ball).—This and the preceding common during migrations.

134. *Mergus americanus* Cass. (sheldrake).—Common along water courses, a few remaining to breed.

135. *Mergus cucullatus* L. (hooded merganser).—Common during winter.

136. *Chræcocephalus philadelphia* Ord. (Bonaparte's gull).—Driven into the interior by storms.

137. *Colymbus torquatus* Brün. (Northern diver).—Occasional along the rivers.

138. *Podiceps californicus* Her. (California grebe).—I saw an example that I referred to this species.

139. *Podiceps clarki* Lawr. (Clarke's grebe).—Occasional along the rivers.

140. *Podilymbus podiceps* L. (dabchick).—More common than the last.

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DO FLYING FISH FLY?

BY C. O. WHITMAN.

OF all the modes of animal locomotion, none has excited more general attention than that of flying creatures; and this is none the less so now that many of those who believe in the ultimate success of "the flying machine," have discarded the balloon theory, and come to regard nature's contrivances for flight as the true models for aërial locomotives. Among those animals that enjoy the much-envied power of flight, none has elicited such universal interest and comment, from old and young, layman and scientist, as that anomalous member of the finny tribe, the flying fish. Science, poetry and fable have conspired to extend the fame of this little denizen of tropical seas, and philosophy has more than once attempted to find some adequate cause for the enormous development of its pectoral limbs, hoping to find here one more important link between swimming and flying animals.

This fish owes its generic name to a curious belief which is said to have been current among the ancients. They supposed that the flying fish—"sea swallows" they called them—left the ocean at night and slept on shore, to avoid the attacks of their marine enemies. From this habit of "sleeping out," they were called *Exocæti*.

Besides *Exocætus*, which includes between forty and fifty different species, there is a genus of flying fish called *Dactylopterus* (finger-winged), from the fact that the fin rays extend, finger-like, beyond the margin of the fins. This genus, popularly named the flying gurnard, is represented by comparatively few species which inhabit the Atlantic, the Mediterranean sea, the Indian ocean and archipelago, and the Japan seas.

To those who may never have had the opportunity to observe